IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

Midtronics, Inc.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Civil Action No. 06 CV 3917
	)	
Aurora Performance Products LLC d/b/a Argus Analyzers and **BPPower Inc.,**	)	Judge Milton Shadur
	)	
Defendants.	)	
	)	

PLAINTIFF'S REVISED PROPOSED
FINDINGS OF FACT AND CONCLUSIONS OF LAW

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Pursuant to the Court's Minute Entry of January 13, 2011 (Docket No. 195), Plaintiff Midtronics, Inc. submits its revised proposed findings of fact and conclusions of law to incorporate the testimony and evidence presented at trial.

I. Procedural Background

1. On July 20, 2006, Plaintiff Midtronics filed suit against Defendant Argus Analyzers, asserting that it infringed United States Patent Number 4,912,416 (the "'416 Patent") through the sales and offers for sale of its battery testing products. (Docket No. 1).

2. On September 6, 2006, Midtronics amended its complaint to add Defendant BPPower and additionally asserted that Defendants infringed United States Patent Number 5,821,756 (the "'756 Patent") by their sales, offers for sale, and importation of Argus Analyzer's battery testing products. (Docket No. 23).

3. On May 22, 2008, Midtronics amended its complaint again and dropped its claims of infringement of the '416 Patent, because the '416 Patent had expired. Midtronics is only seeking injunctive relief based on Defendants' representations of their limited sales. (Docket No. 83; Transcript from Trial, attached as Exhibits A–H, ("Trial Tr.") 190:15–191:8).

4. Starting on January 10, 2011, the Court held a four-day bench trial, at which Dr. Keith Champlin, Stephen McShane, Kevin Bertness, Andrew Kallfelz, and Benson Huang testified as fact witnesses and Thomas Gafford and Dr. Alex Severinsky testified as opinion witnesses for the parties. (Docket Nos. 192–95).

5. Midtronics accuses Defendants of willfully infringing claims 1–4 of the '756 Patent through the sales, offers for sale, or importation of the Argus Analyzers AA350, AA400, AA500, AA500P, and AA550P battery testers (the "Accused Products") manufactured by BPPower. Midtronics seeks an injunction to prohibit future infringement by Defendants with the Accused Products. (Docket No. 171, § II(k)).

6. Defendants sole non-infringement defense is that their products do not measure a dynamic parameter, as that term is used in the '756 Patent. Defendants do not have different non-infringement positions for the different Accused Products. Defendants also contend that claims 1–4 of the '756 Patent are invalid as being obvious in light of the prior art. (Docket No. 171, § II(k); Trial Tr. 34:20–39:9, 547:20–548:12, 603:22–25).

II. The Parties

A. Plaintiff Midtronics, Inc.

7. Headquartered in Willowbrook, Illinois, Midtronics is leader in the battery testing industry. It has over 150 patents relating to battery testing, continues to apply for patents, and has won numerous awards for its innovations and inventions in battery testing. (Trial Tr. 162:13–164:6, 165:2–166:16).

8. Stephen McShane received his bachelor of science degree in electrical engineering from the University of Detroit in 1966 and his MBA from the University of Michigan in 1968. Mr. McShane owns Midtronics and founded it in 1984. (Trial Tr. 159:1–8, 160:4–6).

9. Kevin Bertness received his bachelor of science degree in electrical engineering from the University of Iowa in 1980. Midtronics hired Kevin Bertness in 1994 to move its testing products into the digital age. Mr. Bertness is currently the chief technical officer of Midtronics. (Trial Tr. 207:25–208:24).

10. Dr. Champlin received his Ph.D. in electrical engineering from the University of Minnesota in 1958. He was hired by the University of Minnesota as an assistant professor in electrical engineering in 1958, and he became a full professor in 1967. Dr. Champlin served as a professor at the University of Minnesota for over thirty years before retiring in 1997. He is now a professor emeritus at the University. Dr. Champlin is the pioneering inventor of the dynamic

conductance technology for testing starting and standby batteries and is an inventor of over 30 patents in the battery testing area. Now over eighty years of age, Dr. Champlin continues his research with batteries and continues to apply for patents in this field. (Trial Tr. 60:9–25, 62:7–63:1).

B. **Defendants Argus Analyzers and BPPower**

11. Andrew Kallfelz received his bachelor of science degree in mechanical engineering from Cornell University and his JD from George Washington University. Mr. Kallfelz passed the California bar exam and the United States Patent and Trademark ("USPTO") bar exam. While Mr. Kallfelz assisted in drafting patents, he never was a licensed attorney. (Trial Tr. 443:21–444:5, 486:14–488:7).

12. Mr. Kallfelz founded Argus Analyzers in 2005, and it is headquartered in Jamestown, Rhode Island on his property. Mr. Kallfelz is the owner, president, and sole employee of Argus Analyzers. (Trial Tr. 443:17–20, 446:11–18, 447:16–17).

13. Benson Huang received his bachelor of science degree in electronic engineering from Dan Jiang University in Taipei, Taiwan. (Trial Tr. 339:8–19).

14. Mr. Huang founded BPPower in 2000, and it is headquartered in Taipei, Taiwan. Mr. Huang is the owner and president of BPPower. BPPower designs, manufactures, and sells battery testing products, including the Accused Products. (Docket No. 171, § II(a)(5)–(6) and Appendix A-1 (BPPower Admission Nos. 1, 2, 7, and 8); Trial Tr. 335:1–337:3, 453:12–18, 455:24–25).

15. BPPower sells and imports the Accused Products to Argus Analyzers in the United States. (Docket No. 171, § II(a)(6) and Appendix A-1 (Argus Analyzers Admission Nos. 1 and 2 and BPPower Admission Nos. 7, 8, 13, and 14); Trial Tr. 336:22–337:13, 453:23–25, 456:1–16).

16. Argus Analyzers is the exclusive distributor of BPPower products in the United States, including the Accused Products, and offers for sale or sells the Accused Products in the United States to a variety of customers, including some customers that also purchase Midtronics' battery testers. (Docket No. 171, § II(a)(7)–(8) and Appendix A-1 (Argus Analyzers Admission Nos. 7 and 8); PTX 41 and 42; Trial Tr. 189:8–190:6, 337:8–10, 342:19–20, 452:22–453:25, 456:1–457:9, 462:2–463:20, 506:2–9).

17. Argus Analyzers' sales of the Accused Products have increased in the last two years. (Trial Tr. 463:8–20).[1]

III. Development of the '756 Patented Invention

18. Midtronics is the pioneer and industry leader of dynamic conductance testing of starting batteries. While Midtronics initially met with skepticism from the battery community when it introduced its dynamic conductance technology, today Midtronics' technology has become the industry standard for testing starting batteries. (Trial Tr. 62:25–63:1, 69:17–70:3, 81:24–82:1, 93:10–20, 170:24–171:3, 217:12–18).

19. Starting batteries are typically used in automobiles and other vehicles to provide a large burst of current (hundreds of amps) over a short period of time (*e.g.*, 15 seconds) in order to start the engine. Especially back in the 1990s (at the time relevant to this lawsuit), starting batteries were exclusively lead-acid batteries. Starting batteries are rated in cold cranking amps (CCAs). (Trial Tr. 72:13–73:16, 76:17–25, 164:7–15, 217:24–218:1).

20. Standby batteries are typically used in commercial applications to provide back-up power (such as to run cell phone networks, phone networks, and railroad crossings) in the event of power failures. As a result, they are always kept fully charged. Unlike starting batteries,

[1] Because this portion of the record contains Defendants' confidential sales figures, it has been redacted in Exhibit E. The unredacted portion of the transcript has been filed under seal as Exhibit I.

standby batteries are designed to provide lower current levels for much longer periods of time (*e.g.*, many hours). Like starting batteries, standby batteries are almost exclusively lead-acid batteries. Standby batteries are often rated in amp hours. (Trial Tr. 72:13–25, 73:17–74:2, 76:17–77:3, 164:17–23, 243:16–23).

21. Prior to Midtronics' dynamic conductance technology, the battery industry relied on load testing to test starting batteries. Load testing can only be conducted on a fully-charged battery, which can take hours to charge if it is not already charged. After fully charging a battery before testing, the load test requires the operator to apply a large-current load (equal to half of the battery's CCA in amperes) for fifteen seconds. During the test, the operator must hold the current constant. At the end of the fifteen seconds, the operator records the voltage of the battery. If it exceeds 9.6 volts, the battery is deemed to have passed the test and met its specified CCA rating. This test is prone to operator error, is not repeatable because it leaves the battery polarized or in a reduced state of charge after testing, can pose a safety hazard because of sparking, requires large equipment, and often requires the customer to leave the battery overnight to fully charge the battery before testing. (PTX 1, Col. 1:36–2:20; Trial Tr. 63:2–65:2, 167:11–168:11, 212:9–15, 217:12–18).

22. In his earliest patents, Dr. Champlin discovered that a fully-charged battery's dynamic conductance is related to its condition. One can predict the condition of a battery simply by measuring its dynamic conductance (or inverse dynamic resistance). Dr. Champlin's dynamic testing method has significant advantages over the prior art load test. It draws little energy from the battery, so it can be placed in a substantially smaller package and does not affect the battery in the same way that a load test does. This means that the battery does not become polarized or discharged during the test, and the test can be repeated without having to recharge the battery. It

also is safer because there is less sparking than typically occurs during load tests. (PTX 1, Col. 1:36–2:20; Trial Tr. 65:3–66:22).

23. Dr. Champlin patented an invention incorporating this discovery in 1975, which became U.S. Patent Number 3,873,911. (Trial Tr. 66:12–22, 126:10–12, 127:6–8).

24. In the late 1980s, Dr. Champlin further discovered that the open-circuit voltage is related to both the state of charge of the battery and the normalized dynamic conductance of the battery. As the battery discharges, its open-circuit voltage decreases. Because the open-circuit voltage of the battery and the normalized dynamic conductance vary in a predictable manner, one can test a partially-discharged battery by compensating the dynamic conductance by a correction factor given by the open-circuit voltage. This adjusted dynamic conductance is the equivalent of the dynamic conductance one would expect to measure if the battery was fully charged. In the late 1980s, Dr. Champlin believed that he had discovered a universal correction factor that was applicable to all lead-acid batteries, regardless of their design. Later, Dr. Champlin and the other inventors of the ‘756 Patent determined that there is no universal correction factor for all lead-acid batteries. (PTX 1, Figures 2 and 8; Trial Tr. 78:10–80:14, 83:1–24, 86:16–87:13).

25. Dr. Champlin applied for and received U.S. Patent Number 4,912,416 (the “‘416 Patent”) for this invention, which issued on March 27, 1990. Dr. Champlin is the sole inventor of the ‘416 Patent. (DTX 2; Trial Tr. 77:4–78:9).

26. Building on his prior inventions, Dr. Champlin was able to design the first usable battery tester that could test partially-discharged batteries using the invention disclosed in the ‘416 Patent. In the early 1990s, there were no other starting battery testers that could test partially-discharged batteries. (Trial Tr. 70:21–71:7, 80:15–82:1, 167:11–168:11, 170:24–171:3).

27. Midtronics sold an analog testing device that incorporated the invention of the '416 Patent to Ford Motor Co. in the early 1990s, which was a commercial success. Ford required all of its dealers to purchase and use the device to test vehicles in their service shops. The Ford device was approximately 92% accurate when compared to the standard load test, but substantially more useful and consumer friendly because it could immediately test a battery in a partially-discharged condition. This feature eliminated the need for customers to leave their vehicles overnight in order to charge the battery. (Trial Tr. 167:11–168:11, 168:12–172:8, 212:1–8).

28. In the 1990s, Midtronics was still the only company producing and selling dynamic conductance starting battery testers and the only company that sold any kind of battery tester that could test partially-discharged starting batteries. (Trial Tr. 81:24–82:1, 93:10–20, 170:24–171:3).

29. In 1995, Midtronics wanted to expand on its success with Ford and sell its battery tester to Sears, then the largest battery retailer in the United States. Sears was very interested in the concept, because it wanted to be able to service customers immediately and not require them to leave their batteries overnight for testing. But, Sears rejected an accuracy rate of less than 95% for the batteries it sold. Sears was concerned about increasing its warranty costs to unacceptable levels, so it demanded that Midtronics' device achieve 95% accuracy before it would consider purchasing it. (Trial Tr. 172:9–177:14, 209:20–213:11).

30. Sears had access to extensive battery testing laboratory results from the batteries returned to it by its customers, which included load testing results. Sears shared this information with Midtronics, which had never previously had access to such extensive and detailed laboratory results to aid in producing more accurate testers. (Trial Tr. 211:10–22, 212:21–213:6).

31. Based on the information provided by Sears about its batteries, as well as Midtronics' own testing and research, Midtronics investigated how to improve the accuracy of its testers. Initially, Midtronics explored a variety of possible causes, including circuitry and calibration issues, battery stratification, user errors, corrosion, gassing, climate, grounding issues, and overcharging. None of these suspected problems provided a solution, however. (Trial Tr. 83:25–84:19, 176:15–177:9, 213:12–214:25).

32. After more than a year of research and experimentation, Midtronics determined that it could obtain more accurate results if it adjusted the dynamic parameter by the type of lead-acid battery being tested. Midtronics realized that the universal curve Dr. Champlin thought he discovered with the '416 Patent was not universal after all. While all lead-acid batteries behave similarly at full charge, some vary significantly from others as the batteries discharge. This variation needed to be compensated for in order to achieve the 95% accuracy demanded by Sears. The heart of the invention can be seen in Figure 8 of the '756 Patent, which shows how different battery types behave differently in partially-discharged states. Figure 8 demonstrates that all lead-acid battery types have the same characteristics when they are fully charged, but differ in a partially-discharged condition. (PTX 1, Fig. 8; Trial Tr. 83:1–85:16, 86:16–22, 88:7–9, 176:15–179:16, 215:1–217:11).

33. Based on this innovation, inventors Stephen McShane, Kevin Bertness, and Keith Champlin applied for the '756 Patent on September 26, 1996, and the USPTO issued the '756 Patent on October 13, 1998. (Docket No. 171, § II(a)(1)–(2); PTX 1; Trial Tr. 93:21–94:1, 181:10–16, 209:14–16).

34. On September 20, 1996, prior to filing the application, inventors Stephen McShane, Kevin Bertness, and Keith Champlin assigned their rights to the '756 Patent to

Midtronics, and since that day, Midtronics has been the sole owner of the '756 Patent. (Docket No. 171, § II(a)(3)–(4); PTX 1; PTX 2, pp. MID000409–13; Trial Tr. 94:2–3, 181:10–182:17, 209:17–19).

35. The first product Midtronics sold that incorporated the '756 Patent invention was a digital battery tester it sold to Sears in the summer of 1996 called the MicroPro battery tester. This invention was a significant commercial success for Midtronics and continues to be demanded by Midtronics' customers today. It enabled Midtronics to sell thousands of its innovative testers to the largest battery retailer in the United States, as well as obtaining new business from other large customers. During 1996 and 1997, Midtronics sold millions of dollars of battery testers that used the innovation of the '756 Patent, in addition to millions of dollars of battery testers that only used the earlier invention of the '416 Patent. Even though the average price of testers using the '756 Patent was hundreds of dollars more than the average price of testers that only used the '416 Patent, the marketplace perceived a value to the innovation of the '756 Patent and made it a commercial success. (Trial Tr. 182:19–184:18, 222:5–11).

36. Midtronics continues to incorporate the invention disclosed in the '756 Patent in the products it currently sells. (Trial Tr. 184:13–18, 223:9–11).

IV. '756 Patent and the Court's Claim Construction

37. Of the twelve claims of the '756 Patent, only claims 1–4 are at issue in this lawsuit. (Docket No. 171, § II(k); Trial Tr. 11:25–12:2).

38. Claim 1 states:

> An electronic device for monitoring or testing a battery having one of a plurality of battery types associated therewith, comprising:
>
> input circuitry for receiving information related to the type of the battery;

> dynamic battery parameter determining circuitry for determining an intermediate dynamic parameter of the battery;
>
> open circuit voltage sense circuitry coupled to the battery for sensing an open circuit voltage of the battery;
>
> correction circuitry coupled to the dynamic battery parameter determining circuitry, to the open circuit voltage sense circuitry and to the input circuitry which adjusts the determined intermediate dynamic parameter based upon the battery type information and upon a value of the open circuit voltage of the battery;
>
> output circuitry coupled to the correction circuitry for providing test results indicative of the condition of the battery, wherein the test results are provided as a function of the adjusted intermediate parameter.

(PTX 1, Col. 18:7–27).

39. Claim 2 states:

> The electronic device of claim 1 wherein the test results comprise qualitative results in conformance with the adjusted intermediate dynamic parameter relative to a reference dynamic parameter value.

(PTX 1, Col. 18:28–31).

40. Claim 3 states:

> The electronic device of claim 1 wherein the correction circuitry comprises a microprocessor and wherein digital representations of the open circuit voltage and the intermediate dynamic parameter are both inputted to the microprocessor and combined algorithmically to adjust the intermediate dynamic parameter.

(PTX 1, Col. 18:32–37).

41. Claim 4 states:

> The electronic device of claim 1 wherein the output circuitry provides a special indication when the open circuit voltage is less than a predetermined value and suppresses the test results when the open-circuit voltage is less than the predetermined value.

(PTX 1, Col. 18:38–42).

42. On July 11, 2008, after briefing by the parties, the Court issued a ruling and construed the disputed terms of the patent. In that ruling, the Court held that:

a. "dynamic battery parameter" means "the dynamic conductance or the dynamic resistance of a battery";

b. "dynamic resistance" means "the change in voltage through an element divided by the change in current across the element";

c. "dynamic conductance" means "the change in current through an element divided by the change in voltage across the element"; and

d. "intermediate dynamic parameter" means "unadjusted or uncorrected dynamic battery parameter."

(Docket No. 103, pp. 5 and 8).

43. At trial, none of the parties requested that the Court modify its construction of these terms, and Defendants confirmed to the Court that they accepted these constructions. (Docket Nos. 187, pp. 1–3 and 189, p. 1).

V. Infringement by the Accused Products

A. Law of Infringement

44. Section 271(a) of Title 35 of the U.S. Code defines patent infringement to occur whenever someone "without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent."

45. To prove infringement, a patentee must prove by a preponderance of the evidence that the accused product contains, either literally or under the doctrine of equivalents, each and every limitation of an asserted claim. *Seal-Flex, Inc. v. Athletic Track & Court Constr.*, 172 F.3d

836, 842 (Fed. Cir. 1999). Before determining infringement, the Court must properly construe the terms of the claims at issue. *Id.*

46. Under 35 U.S.C. § 154(a)(2), a patent based on an application filed on or after June 8, 1995 has a term of twenty years from the date of the earliest filed application that it claims priority from. The '756 Patent was filed on September 26, 1996 and claims priority from an application filed on May 1, 1992. Therefore, the '756 Patent expires on May 1, 2012. (PTX 1).

B. The Accused Products

47. The Court finds that Defendants infringe claims 1–4 of the '756 Patent through the sales, offers for sale, and importation of five different models of Defendants' battery testers—the AA350, AA400, AA500, AA500P, AA550P (the Accused Products).

48. The parties agree that Accused Products work identically for purposes of the Court's infringement analysis. Midtronics' opinion witness, Mr. Gafford, testified that he reviewed all of the different versions of source code, schematics, and manuals for these products, as well as personally testing these products and found no meaningful difference between them for purposes of the infringement analysis. Defendants made no arguments otherwise. (Trial Tr. 282:24–284:12, 287:16–288:22, 327:11–329:22, 603:22–25).

C. Claim 1, Preamble

49. The preamble of claim 1 of the '756 Patent is "An electronic device for monitoring or testing a battery having one of a plurality of battery types associated therewith, comprising:." (PTX 1, Col. 18:7–9).

50. The Accused Products are electronic devices that test different types of batteries, as described above. (Gafford Exhibit 2; Trial Tr. 289:1–290:8).

51. Defendants do not dispute that the Accused Products satisfy this limitation. (Docket No. 171, § II(a)(9)).

52. To the extent that the preamble is a limitation, the Court finds that the Accused Products all satisfy this limitation.

D. Claim 1, First Element—Input Circuitry

53. The first element of claim 1 of the '756 Patent is "input circuitry for receiving information related to the type of the battery." (PTX 1, Col. 18:10–11).

54. The Accused Products are electronic battery testers that can test WET, VRLA, and MF automotive lead-acid battery types. (PTX 28, pp. BP3 and 5; Gafford Exhibits 2–4; Trial Tr. 291:19–21).

55. There are buttons on the front of the Accused Products that allow the user to select which type of battery is being tested. These buttons are electrically coupled to the microprocessor and software in the Accused Products. By pressing the buttons on the front of the Accused Products, the user selects which battery type the Accused Products will compensate for. (PTX 12, p. BP182; PTX 28, pp. BP3–5; Gafford Exhibits 3 and 4; Trial Tr. 291:22–293:21).

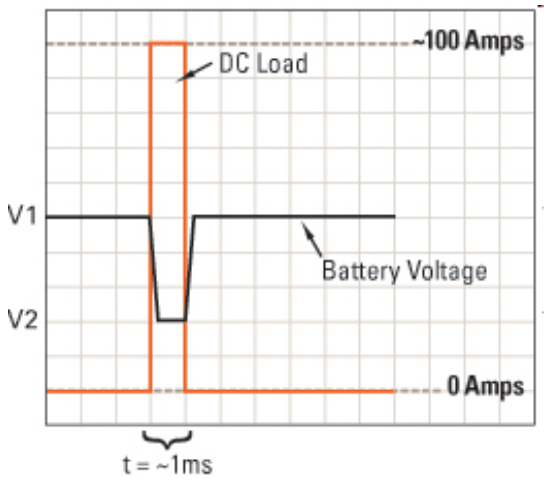
56. Defendants do not dispute that the Accused Products satisfy this limitation. (Docket No. 171, § II(a)(10)).

57. The Court finds, therefore, that the Accused Products all satisfy the input circuitry limitation of claim 1.

E. Claim 1, Second Element—Dynamic Battery Parameter Determining Circuitry

58. The second element of claim 1 of the '756 Patent is "dynamic battery parameter determining circuitry for determining an intermediate dynamic parameter of the battery." (PTX 1, Col. 18:12–14).

59. The Accused Products draw an approximately 100 amp current pulse (or load pulse) from the battery being tested for less than a millisecond in order to measure the resistance and conductance of the battery under test. Graphically, this process is shown in Defendants' literature:



The load pulse used by Defendants is a time-varying signal, because the current in the measurement circuitry changes in time—going from 0 amps to 100 amps back to 0 amps. (PTX 34; Gafford Exhibits 5–8; Trial Tr. 66:23–67:12, 109:18–23, 125:17–126:3, 294:20–297:17).

60. The Accused Products measure the current drawn from the test by measuring the voltage across a known, fixed resistor in series with the battery. Using Ohm's law, the amount of current passing through the fixed resistor will equal the voltage across the resistor divided by the resistance of the resistor. Because the fixed resistor is in series with the battery, the current through the fixed resistor will be the same as the current drawn from the battery by the tester. The Accused Products twice measure the amount of current being drawn from the battery during the pulse and store the value of the current drawn from the battery in variables called currenttemp[0] and currenttemp[1]. These two values are averaged and stored in a variable called Current.AllValue. (PTX 12, pp. BP175–76; Gafford Exhibits 9 and 12; Trial Tr. 97:3–24, 297:18–299:20, 302:20–303:9, 401:3–403:3, 430:6–435:10).

61. When the 100-amp current is being drawn from the battery, the Accused Products measure the voltage of the battery and store it in variables called ADArray[0].AllValue and Battery[2].AllValue. (PTX 12, pp. BP175–76; Gafford Exhibits 9 and 11; Trial Tr. 298:2–299:20, 302:3–18, 554:24–555:1).

62. The load pulse is then turned off, at which time, no current is being drawn from the battery due to the tester. The Accused Products then measure the voltage of the battery when no current is being drawn and store it in a variable called Battery[3].AllValue. (PTX 12, p. BP175; Gafford Exhibits 9–11; Trial Tr. 299:21–301:18, 365:20–22, 554:21–23).

63. The microprocessor in the Accused Products calculates the change in voltage across the battery with and without the current load by subtracting Battery[2].AllValue from Battery[3].AllValue. The result of this subtraction is stored in a variable called BatteryL.AllValue. (PTX 12, p. BP176; Gafford Exhibit 11; Trial Tr. 302:1–19, 555:3–6).

64. The change in current during the test is simply the amount of current that was drawn by the load pulse, because no current is drawn when the pulse is removed. The Accused Products are measuring a change in current during the test, but because during the measurement of the open-circuit voltage the circuit is open and the current is known to be zero, it need not be separately measured. At trial, the Defendants contended that the Accused Products do not measure a change in current because they only make one actual measurement of current, but Defendants' test methodology assumes that one of the current values is zero, so current needs to measured only once. As the Court observed, A – B = A if B is zero, and if one knows that B is zero, there is no need to measure B or explicitly subtract zero from A in order to determine the change. This change in current is stored in the Current.AllValue variable. For purposes of the measuring a dynamic parameter, the only current that matters is the current drawn by the

measurement circuitry, and not any residual currents that may be flowing through the battery due to other loads on the battery. (Gafford Exhibit 12, Trial Tr. 146:23–147:20, 302:20–303:5, 365:20–368:21, 402:23–403:3, 406:4–407:1, 682:3–683:19).

65. The microprocessor in the Accused Products calculates the dynamic resistance of the battery by dividing the change in voltage across the battery (BatteryL.AllValue) by the change in current drawn from the battery (Current.AllValue) during the test by the tester. The result of this calculation is stored in variables called DisplayValue[SelectAH] and BLDisplay[2].LCD6_9. (PTX 12, pp. BP176 and 180; Gafford Exhibits 13 and 26; Trial Tr. 303:6–304:4, 304:13–18, 322:22–323:6, 555:7–9).

66. The microprocessor in the Accused Products calculates the dynamic conductance of the battery by inverting the dynamic resistance. The result of this calculation is stored in variables called DisplayValue[SelectMHO] and BLDisplay[3].LCD6_9. (PTX 12, pp. BP176 and 180; Gafford Exhibits 14 and 26; Trial Tr. 304:4–18, 322:22–323:6).

67. Thus, the Accused Products determine both the dynamic resistance and dynamic conductance of the battery being tested. Because this value is later adjusted, these measured dynamic resistance and dynamic conductance are intermediate dynamic parameters of the battery. (Gafford Exhibits 15, 16, 21–24; Trial Tr. 304:13–307:25, 312:13–314:15, 318:21–320:25).

68. Defendants argue that Midtronics nonetheless disclaimed Defendants' method of calculating a dynamic parameter by virtue of their statements in later correspondence with the European Patent Office (DTX 16) regarding a Bosch reference (DTX 30, Exhibit C). (Trial Tr. 35:7–36:6). The Court disagrees.

69. As an initial matter, Defendants previously made this argument during the Markman process, and the Court considered and rejected this argument before it construed the terms at issue. Because the Defendants did not contest the Court's Markman construction of dynamic parameter, it is improper to raise these same contentions again. As stated above, the Accused Products satisfy the dynamic battery parameter determining circuitry limitation as the Court has construed that term. (Docket No. 90, pp. 13–14; Docket No. 189, p. 1; Trial Tr. 549:4–25).

70. Even considering the merits of Defendants' argument, the Court does not find that Midtronics has specifically disclaimed the method used by Defendants to determine a dynamic battery parameter. The method described in the Bosch reference (DTX 30, Exhibit C) employs arbitrary measurements of current and voltage. In this reference, a large current load is applied to a battery for 30 seconds. Measurements of the voltage of the battery are made 7.5 seconds after application of the current load and 30 seconds after the current load is removed. As can be seen in Figure 2 of the Bosch reference, the voltage changes significantly during the time the current load is applied and also changes significantly after the current load is removed. A resistance value is calculated by dividing the change in voltage by the current applied. If the voltage measurements were made at different times, the results would be entirely different, even though the battery underwent the same test. Thus, these measurements of voltage are arbitrary and the resulting resistance value is arbitrary, just as Dr. Champlin criticized in his letter to the European Patent Office. In addition, this test is not repeatable because it leaves the battery in a changed condition. (DTX 16, p. MID001607; Trial Tr. 619:1–624:24, 643:2–650:25, 684:22–691:14).

71. In contrast, as discussed in the '756 Patent and Dr. Champlin's letter to the European Patent Office, the dynamic measurements of the '756 Patent are not arbitrary, but are

precisely defined and do not significantly discharge or polarize the battery or result in any appreciable changes to the battery. (PTX 1, Col. 2:10–20; DTX 16, p. MID001607; Trial Tr. 733:4–737:11).

72. The Accused Products are significantly different from the device described in the Bosch reference. The Accused Products use a 300–500 microsecond load, in contrast to the 30-second load used in the Bosch reference. Whereas the battery being tested by the Bosch reference device changes conditions, becomes partially discharged, and suffers from polarization effects, the Accused Products do not have those same effects on the batteries they test. (Trial Tr. 230:13–232:14, 624:25–625:25).

73. Like the embodiment described in the ‘756 Patent, the Accused Products draw very little energy from the battery, and, therefore, operate in a small-signal regime that does not perturb the battery. They draw tens of thousands of times less energy from the battery than the standard load test does. Moreover, the Accused Products can be used to test a battery thousands of times in a row without discharging, polarizing, or otherwise affecting the battery. (Gafford Rebuttal Exhibit 5; Trial Tr. 230:13–232:14, 693:9–695:15).

74. The Court finds, therefore, that the Accused Products all satisfy the dynamic battery parameter determining circuitry limitation of claim 1.

F. Claim 1, Third Element—Open Circuit Voltage Sense Circuitry

75. The third element of claim 1 of the ‘756 Patent is “open circuit voltage sense circuitry coupled to the battery for sensing an open circuit voltage of the battery.” (PTX 1, Col. 18:16–17).

76. The Accused Products are connected to the battery by a pair of battery clamps, which are electrically coupled to the microprocessor. The Accused Products measure the open-circuit voltage of the battery being tested, and the microprocessor stores this value in a variable

called SoCDisplay.LCD6_9. (PTX 12, p. BP179; PTX 28, pp. BP5–7; Gafford Exhibits 17 and 18; Trial Tr. 314:16–316:2).

77. Defendants do not dispute that the Accused Products satisfy this limitation. (Docket No. 171, § II(a)(11); Trial Tr. 544:21–23).

78. The Court finds, therefore, that the Accused Products all satisfy the open circuit voltage sense circuitry limitation of claim 1.

G. Claim 1, Fourth Element—Correction Circuitry

79. The fourth element of claim 1 of the ‘756 Patent is “correction circuitry coupled to the dynamic battery parameter determining circuitry, to the open circuit voltage sense circuitry and to the input circuitry which adjusts the determined intermediate dynamic parameter based upon the battery type information and upon a value of the open circuit voltage of the battery.” (PTX 1, Col. 18:18–23).

80. The Accused Products adjust the dynamic conductance of the battery (DisplayValue[SelectMHO]) by first converting it into a CCA value by multiplying the dynamic conductance by a constant number. The result of this calculation is stored in a variable called DisplayValue[SelectCCA]. (PTX 12, p. BP176; Gafford Exhibit 21; Trial Tr. 319:2–14).

81. The Accused Products adjust the CCA value by multiplying it by a constant number that is different for different battery types. The result of this calculation is overwritten in the variable DisplayValue[SelectCCA]. (PTX 12, p. BP176; Gafford Exhibit 22; Trial Tr. 319:15–320:2).

82. The Accused Products calculate a state of charge percentage (SoCPercent) that is equal to the open-circuit voltage (SoCDisplay.LCD6_9) multiplied by a constant number minus a factor (add_v) that is different for different battery types. (PTX 12, p. BP179; Gafford Exhibit 23; Trial Tr. 320:5–14).

83. The Accused Products adjust the adjusted CCA value by dividing it by the state of charge percentage (SoCPercent). The result of this calculation is stored in a variable called BLDisplay[0].LCD6_9. (PTX 12, p. BP180; Gafford Exhibit 24; Trial Tr. 320:17–25).

84. Thus, the Accused Products adjust the intermediate dynamic parameter (the measured dynamic conductance) by both the battery type and the open-circuit voltage of the battery. (PTX 12, pp. BP176, 179–80; Gafford Exhibits 21–24; Trial Tr. 319:2–321:5).

85. Defendants do not dispute that the Accused Products satisfy this limitation. (Docket No. 171, § II(a)(13)).

86. The Court finds, therefore, that the Accused Products all satisfy the correction circuitry limitation of claim 1.

H. Claim 1, Fifth Element—Output Circuitry

87. The fifth element of claim 1 of the ‘756 Patent is “output circuitry coupled to the correction circuitry for providing test results indicative of the condition of the battery, wherein the test results are provided as a function of the adjusted intermediate parameter.” (PTX 1, Col. 18:24–27).

88. The microprocessor in the Accused Products calculates a battery life percentage (BLDisplay[0].Percent) based on the twice-adjusted CCA value (BLDisplay[0].LCD6_9) in a subroutine called ConvertBL. (PTX 12, p. BP180; Gafford Exhibits 26 and 27; Trial Tr. 321:19–323:13).

89. The microprocessor in the Accused Products calculates a battery life test result based on the open-circuit voltage and battery life percentage in a subroutine called CheckLimit. (PTX 12, p. BP187; Gafford Exhibit 29; Trial Tr. 324:19–25).

90. The Accused Products display the twice-adjusted CCA value (BLDisplay[0].LCD6_9), a battery life percentage (BLDisplay[0].Percent), and an icon

displaying the battery life test results. Thus, the Accused Products display test results based on an adjusted intermediate parameter of the battery. (PTX 12, pp. BP180 and 187; PTX 28, p. BP8; Gafford Exhibits 26, 27, 29; Trial Tr. 321:19–323:13, 324:19–25).

91. Defendants do not dispute that the Accused Products satisfy this limitation. (Docket No. 171, § II(a)(14)).

92. The Court finds, therefore, that the Accused Products all satisfy the output circuitry limitation of claim 1.

I. Claim 2

93. Claim 2 of the ‘756 Patent is “The electronic device of claim 1 wherein the test results comprise qualitative results in conformance with the adjusted intermediate dynamic parameter relative to a reference dynamic parameter value.” (PTX 1, Col. 18:28–31).

94. The Accused Products display a pass/fail icon (which is a qualitative indicator) based on the adjusted intermediate dynamic parameter relative to a reference value. (PTX 12, p. BP187; PTX 28, p. BP8; Gafford Exhibits 28 and 29; Trial Tr. 323:17–324:25).

95. Defendants do not dispute that the Accused Products satisfy this limitation.

96. The Court finds, therefore, that the Accused Products all satisfy the limitations of claim 2.

J. Claim 3

97. Claim 3 of the ‘756 Patent is “The electronic device of claim 1 wherein the correction circuitry comprises a microprocessor and wherein digital representations of the open circuit voltage and the intermediate dynamic parameter are both inputted to the microprocessor and combined algorithmically to adjust the intermediate dynamic parameter.” (PTX 1, Col. 18:32–37).

98. The Accused Products contain microprocessors that perform the calculations described above using digital representations of the open circuit voltage and intermediate dynamic parameter. (PTX 15, ARG1023; Gafford Exhibit 30; Trial Tr. 325:4–24).

99. Defendants do not dispute that the Accused Products satisfy this limitation.

100. The Court finds, therefore, that the Accused Products all satisfy the limitations of claim 3.

K. Claim 4

101. Claim 4 of the ‘756 Patent is “The electronic device of claim 1 wherein the output circuitry provides a special indication when the open circuit voltage is less than a predetermined value and suppresses the test results when the open-circuit voltage is less than the predetermined value.” (PTX 1, Col. 18:38–42).

102. The Accused Products do not display a battery life percentage or an icon displaying the battery life test results if the open-circuit voltage of the battery is below the threshold value stored in the variable Threshold1. (PTX 12, p. BP180; PTX 28, p. BP8; Gafford Exhibits 31 and 32; Trial Tr. 325:25–327:10).

103. Defendants do not dispute that the Accused Products satisfy this limitation.

104. The Court finds, therefore, that the Accused Products all satisfy the limitations of claim 4.

L. Conclusion

105. As stated above, Defendants offered for sale, sold, and imported the Accused Products in or into the United States during the term of the patent.

106. Therefore, based on the findings that the Accused Products contain each and every limitation of claims 1–4 of the ‘756 Patent, the Court concludes that Defendants infringe

these claims by their sales, offers for sale, and importation of the Accused Products in or into the United States during the term of the patent.

VI. Willful Infringement

A. Law of Willful Infringement

107. In *In re Seagate Technology, LLC*, 497 F.3d 1360, 1371 (Fed. Cir. 2007) (en banc), the Federal Circuit set forth a two-pronged test for assessing whether an infringer has willfully infringed a patent claim. First, a patentee must prove by clear and convincing evidence that "the infringer acted despite an objectively high likelihood that its actions constituted infringement of a valid patent." *Id.* This is an objective inquiry, and the state of mind of the infringer is irrelevant. *Id.* If this objective threshold is met, the patentee "must also demonstrate that this objectively-defined risk . . . was either known or so obvious that it should have been known to the accused infringer." *Id.*

108. Implicit in this requirement is that the patentee prove that the infringer had actual knowledge of the relevant patent. *I4I Ltd. Partnership v. Microsoft Corp.*, 598 F.3d 831, 858 (Fed. Cir. 2010).

109. Among the many relevant factors in making this determination is whether the infringer attended demonstrations of the patentee's product, handled or received materials identifying the products as being patented, whether the infringing products perform similarly to the patentee's products, and whether the infringer made a good faith effort to design around or avoid infringement. *Id.* at 860.

110. The fact that a defendant presents a non-infringement and invalidity defense at trial does not necessarily mean that its infringement is not willful. *Id.*

B. Defendants Willfully Infringed Claims 1–4 of the '756 Patent

111. Argus Analyzers and BPPower designed and developed the Accused Products in three months, and they were first sold in 2005. (Trial Tr. 336:3–15, 341:22–342:2, 454:1–8).

112. In 2004, prior to selling the Accused Products, Defendants spoke with individuals from Midtronics and viewed and operated Midtronics' products at a trade show in Germany. Midtronics' products are marked with their patent numbers, including the '756 Patent at issue in this lawsuit. Defendants also obtained samples of Midtronics' battery testers. (Trial Tr. 184:19–185:14, 188:6–12, 337:14–338:8, 389:10–390:12).

113. During continual development of and revisions to the Accused Products, Defendants looked at Midtronics' products and compared the results obtained with the Accused Products with results from Midtronics' testers in order to make sure that the Accused Products had consistent results. The Accused Products ultimately sold by Defendants performed similarly to Midtronics' products and produced the same results. The Midtronics products were designed to measure dynamic parameters, so when the Accused Products obtained consistent results with Midtronics' equivalent products, it is proof that the Defendants were infringing the '756 Patent because they too were measuring dynamic parameter and they were knowingly doing so. (Trial Tr. 231:25–232:21, 338:9–19, 448:2–7, 450:22–451:3).

114. Defendants admit that they were aware of the '756 and '416 Patents, as well as every other Midtronics' patent Mr. Kallfelz could find, before the filing of the lawsuit. Mr. Kallfelz further admits that he personally read the '756 Patent and analyzed it. The only reason Mr. Kallfelz gave for not believing that Defendants infringed the '756 Patent was because he thought that the Accused Products were not measuring a dynamic parameter. Mr. Kallfelz did not identify any invalidity positions. (Trial Tr. 445:12–16, 521:16–524:18, 529:16–19).

115. Mr. Kallfelz also claims to have obtained an opinion of counsel regarding the '756 Patent and the Accused Products from his trial counsel, Mr. de Angeli. Defendants refused to turn the opinion over to Midtronics during discovery, claiming that it was protected by the attorney-client privilege. (Trial Tr. 444:9–445:11). By not turning over the opinion of counsel based on a claim of privilege, Defendants cannot now rely on this opinion to refute the charge of willful infringement. *See, e.g., United States v. Doe (In re: Grand Jury Proceedings),* 219 F.3d 175, 182 (2d Cir. 2000) ("a party cannot partially disclose privileged communications or affirmatively rely on privileged communications to support its claim or defense and then shield the underlying communications from scrutiny by the opposing party").

116. In March 2006, Mr. McShane met with Mr. Kallfelz and Mr. Huang and discussed Defendants' infringement of Midtronics' patents through the sale of the Argus Analyzer battery testers. (PTX 49, p. MID149–50; Trial Tr. 186:10–188:5, 390:24–391:2, 517:8–23).

117. After Mr. McShane met with Defendants, Mr. McShane e-mailed Mr. Huang in March 2006 to reiterate that Defendants' battery testers infringed Midtronics' patents. (PTX 49, p. MID148–50; Trial Tr. 187:15–188:5, 393:6–396:7, 518:1–4).

118. Defendants continued to import, sell, and offer for sale their battery testers that infringed Midtronics' patents after these conversations with Mr. McShane and after having actual knowledge of the '756 Patent. (PTX 41 and 42; Trial Tr. 462:2–463:20).

119. Midtronics filed suit against Argus Analyzers on July 20, 2006 for infringement of the '416 Patent. Midtronics amended its complaint on September 7, 2006 to add the '756 Patent (and BPPower). (Docket Nos. 1 and 23).

120. The Court issued its construction of the disputed claim terms in the '756 Patent on July 11, 2008. (Docket No. 103).

121. On July 17, 2009, counsel for Defendants informed the Court at a status hearing that Defendants would redesign their battery testing products and voluntarily stop selling the products that were then accused of infringing the '756 Patent. Despite this representation, Defendants never stopped selling any of the Accused Products that they were selling in July 2009. (Docket Nos. 145 and 149; Hearing Transcript from July 17, 2009, attached as Exhibit J, 11:1–8, 13:11–14:7; Trial Tr. 453:2–8).

122. On October 7, 2009, Defendants sent Midtronics a sample of this redesigned product (the AA550P battery tester). Defendants also imported the AA550P for sales presentations to Exide and others. (Docket No. 151, p. 5; PTX 62 and 65).

123. Defendants knew that the AA550P battery tester infringed the '756 Patent when they sent the sample to Midtronics and when they offered the AA550P for sale to a company in the United States. (Trial Tr. 457:10–13).

124. Despite redesigning the AA550P, Defendants made no changes that were meaningful for infringement purposes and claimed that the changes they did make had nothing to do with dynamic parameters or measurements. Despite this, Defendants offered no non-infringement defense that was unique to the AA550P. Instead, Defendants relied on the same non-infringement defense for all the Accused Products. (Trial Tr. 525:12–20, 603:22–25).

125. During the more than four-year pendency of the lawsuit, Defendants made no meaningful changes to the operation of the Accused Products for purposes of infringement. (Trial Tr. 288:12–22, 525:12–20).

126. Midtronics has proven by clear and convincing evidence that Defendants were aware of the '756 Patent prior to the filing of this lawsuit, that Defendants acted despite an objectively high likelihood that its actions constituted infringement of a valid patent, and that Defendant knew or should have obviously known that their actions infringed Midtronics' patent. Thus, the Court concludes that Defendants have willfully infringed the '756 Patent.

VII. Validity of Claims 1–4 of the '756 Patent

A. Law of Validity

127. Pursuant to 35 U.S.C. § 103(a), an invention cannot be patented if "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." The relevant inquiry is based on the state of knowledge at time the application is filed, not on the present-day state of knowledge. Hindsight bias and *ex post* reasoning must be avoided. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

128. In order to assess whether a patent claim is obvious, four factual inquiries are made: (1) the scope and content of the prior art, (2) the differences between the claims and prior art, (3) the level of ordinary skill in the art, and (4) secondary considerations. *Proctor & Gamble Co. v. Teva Pharms. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009).

129. Among relevant secondary considerations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966), are (1) commercial success, (2) long felt but unresolved needs, and (3) failure of others. In addition, prior art that teaches away from the claimed invention or unexpected results are evidence that the combination is not obvious. *KSR*, 550 U.S. at 416; *In re Sullivan*, 498 F.3d 1345, 1351 (Fed. Cir. 2007).

130. A party seeking to invalidate a claim of a patent must prove "by clear and convincing evidence that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so." *Proctor & Gamble*, 566 F.3d at 994. The Supreme Court clarified in *KSR* that the Federal Circuit's teaching-suggestion-motivation (TSM) test provides a helpful insight in this analysis, but is not to be rigidly applied. *KSR*, 550 U.S. at 418–19.

131. The Court further reiterated that a patent claim comprised of several elements, each of which is known in the prior art does not automatically render the claim obvious, because almost all inventions are combinations of elements that are previously known. *Id*.

132. Moreover, conclusory statements that a claim is obvious are not sufficient. "[I]nstead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *Id.* at 418. For all of the reasons articulated in Gafford Rebuttal Exhibits 1–3 and 5–17, which are admitted into evidence pursuant to Federal Rule of Evidence 1006 and agreement of the parties, Defendants' claims of invalidity fail.

B. Defendants Failed to Prove by Clear and Convincing Evidence that Claims 1–4 of the '756 Patent Are Invalid as Obvious

133. Defendants identified four prior art references that they contend in combination render claims 1–4 of the '756 Patent invalid—(1) the '416 Patent (DTX 2), (2) a 1993 article written by Midtronics entitled "Updated Status of Conductance/Capacity Correlation Studies to Determine the State-of-Health of Automotive SLI and Stand-by Lead Acid Batteries" (DTX 19, pp. MID8688–705), (3) U.S. Patent Number 5,164,652 entitled "Method and Apparatus for Determining Battery Type and Modifying Operating Characteristics" (DTX 12), and (4) U.S.

Patent Number 4,849,682 entitled "Battery Charging System" (DTX 13). (Trial Tr. 580:21–581:3, 584:16–585:8, 592:3–23).

1. The '416 Patent (DTX 2)

134. The '416 Patent is a patent previously issued to Dr. Champlin, one of the inventors of the '756 Patent. The '416 Patent describes a device that can determine the capacity of a partially-discharged battery by measuring the dynamic conductance and open-circuit voltage of a battery. The '416 Patent indicates that the inventor believed that he had discovered a universal curve with respect to all lead-acid starting batteries:

> The fact that the same empirical relation shows strong correlation with experimental data obtained for both 6-volt and 12-volt batteries indicates that the empirical state-of-charge correction disclosed in FIG. 2 is quite universal and is actually a fundamental property of a single cell.

(DTX 2, Col 5:54–59). This belief is consistent with the fact that all lead-acid batteries behave the same when fully charged and follow the exact same chemical equation, regardless of construction or type. (DTX 2; Trial Tr. 78:10–80:14, 83:1–24, 87:10–20, 215:18–217:11).

135. While the '416 Patent has language that indicates that different correction factors may be necessary for Nickel-Cadmium and Lithium batteries, the unrebutted testimony is that this was speculation at the time by the inventor and that this method of measuring partially-discharged batteries will not, in fact, work for those types of battery chemistries because of their unique discharge properties. (DTX 2; Trial Tr. 88:20–90:15, 218:2–220:11, 246:24–251:13).

136. The '416 Patent teaches away from the need to use different compensation curves for lead-acid batteries. (DTX 2, Col. 5:54–59; Trial Tr. 83:1–24, 698:20–25, 699:21–701:14).

137. The '416 Patent discloses all of the elements of claim 1 of the '756 Patent except for "input circuitry for receiving information related to the type of the battery" and "correction

circuitry coupled to . . . the input circuitry which adjusts the determined intermediate dynamic parameter based upon the battery type information." (Trial Tr. 576:21–580:19).

138. Instead, Defendants argue that the '416 Patent in combination with the other references renders claims 1–4 of the '756 Patent invalid. (Trial Tr. 580:21–581:3, 584:16–585:8, 592:3–23).

139. Dr. Champlin was the sole inventor of the '416 Patent and a co-inventor of the '756 Patent. If the invention of the '756 Patent regarding the different characteristics of partially-discharged lead-acid batteries was "obvious," logically it would never have taken him over a year of research and trial and error testing to invent a solution to the Sears' demand for greater accuracy. (PTX 1, DTX 2).

2. Encyclopedia of Conductance (DTX 19)

140. The article "Updated Status of Conductance/Capacity Correlation Studies to Determine the State-of-Health of Automotive SLI and Stand-by Lead Acid Batteries" is a two-part article that summarizes Midtronics' dynamic testing of starting batteries and stand-by batteries. (DTX 19, pp. MID8688–705; Gafford Rebuttal Exhibit 9; Trial Tr. 627:9–628:5, 703:23–704:17).

141. Defendants argue that this article shows that those skilled in the art recognized that different battery types had different discharge characteristics and, therefore, recognized that the dynamic conductance measurements would need to be compensated differently for different battery types. Defendants point to nothing in the article that supports such a conclusion, however. Standby batteries are never tested in less than a fully discharged condition. Figure 8 of the '756 Patent reveals that all lead acid batteries have identical characteristics at full charge. Therefore, any analysis of standby batteries could never have disclosed the invention of the '756

Patent regarding the testing of partially discharged batteries. (Trial Tr. 73:3–74:2, 86:16–20, 217:3–11, 585:2–592:2).

142. In the section describing starting batteries, there is no discussion of different types of starting batteries or recognition that different battery types had different conductance properties. Indeed, Midtronics states that its then-current method (described in the '416 Patent), was highly accurate even though there was no correction for battery type. (DTX 19, pp. MID8690–95, 8704; Gafford Rebuttal Exhibit 10; Trial Tr. 628:6–629:12, 704:17–705:8).

143. The section describing standby batteries does mention different battery types, but there is no analysis or recognition that dynamic conductance measurements needed to be compensated differently based on battery type. The only graphs in this section show measurements of the dynamic conductance of fully-charged standby batteries. (DTX 19, pp. 8695–704; Gafford Rebuttal Exhibit 10; Trial Tr. 629:13–631:7, 651:15–653:2, 704:17–705:8).

144. Moreover, standby batteries have different properties and characteristics than starting batteries, and there was no testimony explaining why measurements that are relevant for standby batteries would have any relevance to starting batteries. In fact, the testimony was just the opposite—because different characteristics are relevant for standby batteries, they are measured differently and the techniques for one are not applicable to the other. (Trial Tr. 72:5–74:23, 164:4–165:1).

145. In sum, the Court finds no support in this reference for the proposition that this reference and the '416 Patent contain all of the elements of claims 1–4 of the '756 Patent.

3. The '652 Patent (DTX 12) and the '682 Patent (DTX 13)

146. United States Patent Number 5,164,652 by Johnson *et al.* (DTX 12) discloses a detector for battery charging equipment. It does not disclose, teach, or mention measuring

dynamic battery parameters (*i.e.*, dynamic resistance or dynamic conductance) anywhere in the reference. (Gafford Rebuttal Exhibits 13 and 14; Trial Tr. 633:3–21, 706:20–707:13).

147. United States Patent Number 4,849,682 by Bauer *et al.* (DTX 13) discloses a battery charging system. It also does not disclose, teach, or mention measuring dynamic battery parameters anywhere in the reference. (Gafford Rebuttal Exhibits 15 and 16; Trial Tr. 633:22–634:10, 707:16–708:20).

148. At most, these references show that others skilled in the art knew how to construct circuitry that detects the type of battery in a system, albeit using an entirely different methods than described in the ‘756 Patent or implemented by Defendants in the Accused Products. (Trial Tr. 592:3–23).

149. These references are not relevant to the underlying question—whether it was obvious to those skilled in the art that dynamic conductance (or resistance) of different types of lead-acid batteries need to be compensated differently in order to assess the condition of a starting battery. These references shed no light on that subject at all.

150. Thus, the Court finds that these references when combined with the other references described above do not contain all of the elements of claims 1–4 of the ‘756 Patent.

4. Alber Article (DTX 20)

151. While Defendants originally included the article “Are Internal Cell Parameter Measurements a Substitute or Supplement to Capacity Testing?” by Glenn Alber (DTX 20), which describes resistance measurements made of standby batteries, as part of their invalidity defense, they did not address this article during trial and thus waived it. Even if the Court were to consider this reference, it does not render the ‘756 Patent obvious.

152. This article only describes measurements of standby batteries, not starting batteries. Moreover, this article criticizes using resistance measurements to test batteries,

claiming that they "cannot be used to accurately predict the capacity or remaining life." Finally, this reference indicates that state of charge compensation is not necessary because state of charge has a negligible effect on the resistance of the battery. (DTX 20, p. 9; Gafford Rebuttal Exhibits 11 and 12; Trial Tr. 631:8–633:2, 705:9–706:19).

153. To the extent that this reference teaches anything, it teaches away from the invention described in the '756 Patent. It indicates that resistance measurements are not accurate and that no compensation is needed. (DTX 20, p. 9; Gafford Rebuttal Exhibit 12; Trial Tr. 631:8–633:2, 706:8–13).

154. The Court finds no support in this reference for the proposition that this reference and the '416 Patent (or any of the other references) contain all of the elements of claims 1–4 of the '756 Patent.

C. Secondary Considerations

155. The Court also finds that the secondary consideration factors also weigh against a finding of obviousness.

156. As to the first secondary consideration—commercial success, the Court finds that this factor weighs against a finding of obviousness. The unrebutted testimony was that Midtronics' customers eventually paid several hundred dollars more for improved accuracy in a battery tester. Sears refused to purchase products from Midtronics until Midtronics could solve the accuracy problem. Only after Midtronics solved the problem was it able to sell its testers to Sears. In the first two years, Midtronics sold millions of dollars of testers using the '756 Patented invention, despite offering testers that were hundreds of dollars cheaper that only used the '416 Patented invention. The patented features continue to be demanded by Midtronics customers to this day. This evidence shows that the '756 Patent provided a commercially-valuable benefit that

its customers were willing to pay a premium for. (Trial Tr. 172:9–178:5, 182:19–184:18, 210:9–213:11).

157. The second factor—the long felt need in the industry, also weighs against a finding of obviousness. The testimony was clear that the starting battery industry was seeking ways to improve customer service by providing faster service to its customers without sacrificing meaningful accuracy. Sears, for example, wanted to be able to test partially-discharged batteries, but had no means to do so at 95% accuracy before the ‘756 Patent. In the 1990s, Midtronics was the only company that offered the possibility of testing partially-discharged batteries, but the accuracy using the ‘416 Patented technology was not sufficient. The evidence shows that the relevant industry had a need that it could not meet. (Trial Tr. 81:24–82:1, 93:10–20, 167:11–178:5, 217:12–18).

158. The third factor—failure of others, also weighs against a finding of obviousness. Despite the long felt need in the industry for a tester that could test partially-discharged batteries, no other company was able to provide a solution before Midtronics. This further suggests that the technology was innovative and non-obvious. (Trial Tr. 81:24–82:1, 93:16–20, 217:12–18).

159. In addition, the story of the creation and innovations that led to the ‘756 Patent proves that the ‘756 Patent was not obvious. The inventors were the pioneers in the industry, and they understood the technology better than anyone else. There were no other companies that were selling starting battery testers using Dr. Champlin’s dynamic testing methods. Despite being the only experts in the field, they pursued multiple false solutions and had to work for more than a year to discover the solution that became the ‘756 Patent, even though they had a very strong economic motive for finding a solution as fast as possible. Were the solution as obvious as Defendants’ claim, one would have expected the experts in the field to have arrived at

the solution much sooner, and not to have wasted time exploring other false solutions first. (Trial Tr. 82:2–88:19, 91:19–92:8, 101:14–23, 172:9–179:16, 209:20–217:18, 276:24–277:5).

160. Moreover, it is understandable why the solution eluded the inventors at first. As can be seen from Figure 8 of the ‘756 Patent, all types of lead-acid batteries behave the same when fully charged, which is the condition where the rest of the industry was testing batteries. In addition, all lead-acid batteries were known to follow the same chemical equation. There was no accumulated body of knowledge showing that partially-discharged lead-acid batteries behaved differently based on the type of battery. Midtronics was the first to produce a commercially-successful tester that could test partially-discharged batteries. Even this experience did not suggest that different types of batteries would need to be compensated differently. Midtronics first major sale of testers using the ‘416 Patented invention was to Ford, which used similar types and qualities of batteries in all the vehicles it sold (and therefore serviced). It was not until Midtronics tried to sell this tester to Sears, which also sells starting batteries for much wider applications (lawn tractors, trucks, etc.) and of much different quality of construction, that the problem appeared. (Trial Tr. 87:10–20, 93:10–20, 168:12–171:3, 211:16–25, 215:18–216:14, 217:3–18).

161. In addition, the key references that Defendants cite—the ‘416 Patent and the Encyclopedia of Conductance article—were documents authored by the inventors themselves. They would be expected to know and understand these references better than anyone else. In spite of this intimate knowledge of these references, the inventors still required more than a year of research and experimentation to find the solution. (DTX 2; DTX 19, p. 8688; Trial Tr. 101:14–23, 179:6–16, 210:2–4).

D. Conclusion

162. Therefore, the Court finds that Defendants have failed to prove by clear and convincing evidence that claims 1–4 of the '756 Patent are invalid as being obvious in light of the prior art cited. The cited references do not contain all of the limitations found in the '756 Patent and the secondary considerations all weigh heavily against a finding of obviousness.

VIII. Permanent Injunction

A. Law of Permanent Injunctions in Patent Infringement Actions

163. In *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391 (2006), the Supreme Court confirmed that patentees seeking a permanent injunction must satisfy the standard four-factor test for injunctions—(1) that it has suffered an irreparable injury, (2) there is an inadequate remedy at law, (3) that the balance of hardships warrant an injunction, and (4) that the public interest is not disserved by the injunction. The decision of whether or not to grant a permanent injunction rests in the sound discretion of the Court. *Id.*

B. Irreparable Harm

164. In assessing whether a patentee has suffered irreparable harm, a court can look to whether the parties are competitors and the effect of allowing a competitor to supply the infringing product, including past harms, such as whether the infringing product has caused the patentee to lose business, revenues, or brand recognition. *I4I Ltd. Partnership v. Microsoft Corp.*, 598 F.3d 831, 861 (Fed. Cir. 2010); *Acumed LLC v. Stryker Corp.*, 551 F.3d 1323, 1328–29 (Fed. Cir. 2008).

165. The parties admit that they are direct competitors and sell their products to some of the same customers. Defendants further admit that they specifically pitch their products against Midtronics' products. The evidence further showed that Defendants' infringement caused harm to Midtronics by virtue of losing sales, reducing profit margins, having customers demand

lower prices, by having to buy back Defendants' products from old customers in order to secure new orders, hurting Midtronics' reputation as the industry leader, and harming private label relationships. (Trial Tr. 188:13–190:11, 191:19–192:2, 448:2–4, 450:22–452:15, 506:1–9).

166. Defendants testified that their sales are increasing, so the harm to Midtronics will likely get worse. (Trial Tr. 463:8–20).[2]

167. These facts suggest that Midtronics will be irreparably harmed if Defendants' infringement is not stopped.

C. Inadequate Remedy at Law

168. In assessing whether there is an inadequate remedy at law, a court can look at the patentee's past practices of licensing the patent in suit (such as loss of market share, brand recognition, and customer goodwill), the consequences of allowing the infringer to continue selling the infringing product under a license, and the difficulties in assessing the damage caused by allowing such sales. *I4I*, 598 F.3d at 862.

169. Where the damages would be difficult to quantify, that indicates that remedies at law may be inadequate. *Id.*

170. If a patentee has previously licensed the patent, the nature of the license is relevant for the Court's consideration. For instance, licenses to resolve prior litigation or that were made to a company that was not a direct competitor carry less weight than those made to competitors as the result of normal business dealings. *Acumed*, 551 F.3d at 1328–29.

171. As stated above, Defendants' infringement has affected Midtronics by placing price pressures on its products and by requiring it to purchased Defendants' products in order to obtain new sales from customers. (Trial Tr. 188:13–190:6).

[2] *See* footnote 1. The unredacted portion of the transcript has been filed under seal as Exhibit I.

172. In addition, because Defendants' sales were small, Midtronics dropped its claim for damages because it believed that the cost of hiring an opinion witness to assess the damages would exceed the amount of expected recovery. The only remedy Midtronics seeks is an injunction, which further suggests that money damages are not adequate. (Trial Tr. 190:21–191:8).

173. Defendants contend that Midtronics' prior licensing of the '756 Patent demonstrates that it has an adequate remedy at law. Midtronics has only licensed the '756 Patent once as part of a settlement agreement in another litigation. Such a license given in such a circumstance does not indicate that a license to Defendants would be an appropriate or adequately remedy to compensate Midtronics. (Trial Tr. 191:9–18).

174. These facts suggest that Midtronics does not have an adequate remedy at law.

D. Balance of Hardships

175. This factor assesses the relative effect of granting or denying the injunction on the parties, not the public. *I4I*, 598 F.3d at 862. The Court should consider the size of the parties, the products at issue, the parties' revenue sources, and the importance of the patented technology to the patentee. *Id.* The Court is not to consider a defendant's investments in creating the product or the cost of redesigning the product as factors favoring the defendant. *Id.* at 863. The commercial success of the infringing product and sunk development costs are not to be used as a shield for the defendant. *Id.*

176. Because Defendants' sales are minimal, the only relief that Midtronics seeks is injunctive relief. To deny an injunction would leave Midtronics with no remedy in this case, even though it prevailed at trial after more than four years of litigation. (Trial Tr. 190:21–191:8, 462:2–463:20).

177. Defendants face modest hardships if an injunction is granted. They have already demonstrated that it is possible to create a redesigned product in a matter of a couple of months, and Defendants have not shown any particular hardship in doing so as they voluntarily did so during the litigation. In addition, any injunction would only last a relatively short amount of time, because the patent expires on May 1, 2012. (Trial Tr. 525:21–526:2).

178. Midtronics, on the other hand, continues to face customer pressures that it should not have to face. (Trial Tr. 188:13–192:2).

179. On balance, these facts suggest that the hardships of granting an injunction are not outweighed by the hardships of not granting the injunction

E. Public Interest

180. The final factor looks to the balance between protecting a patentee's rights in its intellectual property with protecting the public's rights from the effects of granting an injunction. *I4I*, 598 F.3d at 863. Matters of public safety or health can give rise to a significant public interest warranting the denial of an injunction. *Acumed*, 551 F.3d at 1331.

181. In this case, there is no public safety or health issue in this case that warrants denial of an injunction. The Accused Products test car batteries, and there are numerous options for the public to purchase and use other competitors' car battery testers during the prospective term of an injunction. (Trial Tr. 165:11–16).

182. On the other hand, there is a substantial public interest in protecting the patent rights of inventors and patentees from infringers. *I4I*, 598 F.3d at 863.

183. Here, the public interest clearly favors the granting of an injunction.

F. Midtronics Is Entitled to a Permanent Injunction Against Defendants

184. The four factors the Court is to consider in determining whether to grant an injunction all favor or do not counsel against the grant of an injunction.

185. Thus, the Court finds that Midtronics is entitled to a permanent injunction prohibiting Defendants and their employees, agents, officers, owners, and affiliates from making, using, offering for sale, or selling within the United States or importing into the United States the AA350, AA400, AA500, AA500P, or AA550P products (or products not colorably different than these products) until the expiration of the '756 Patent on May 1, 2012. Midtronics is to submit a proposed permanent injunction order setting forth the terms of such an injunction.

IX. Attorney Fees and Costs

A. Law of Exceptional Cases in Patent Infringement Actions

186. Pursuant to 35 U.S.C. § 285, in exceptional cases the Court may award a prevailing party in a patent infringement lawsuit its reasonable attorney fees, which includes expenses necessary "to compensate the prevailing party for its monetary outlays in the prosecution or defense of the suit." *Central Soya Co. v. Geo. A. Hormel & Co*., 723 F.2d 1573, 1578 (Fed. Cir. 1983). The Court has broad discretion to determine whether to award attorney fees. *Takeda Chem. Indus., Ltd. v. Mylan Labs., Inc.*, 549 F.3d 1381, 1385 (Fed. Cir. 2008); *Imonex Servs., Inc. v. W.H. Munzprufer Dietmar Trenner GMBH*, 408 F.3d 1374, 1378 (Fed. Cir. 2005).

187. Costs such as court fees, transcripts, copying, and court reporting are also taxable under 28 U.S.C. § 1920 and Federal Rule of Civil Procedure 54(d)(1).

188. The Court also has the inherent power beyond 35 U.S.C. § 285 to award opinion witness fees in cases of bad faith, fraud, or abuse of the judicial process. *Takeda Chem.*, 549 F.3d at 1391.

189. In determining whether to declare a case exceptional and award attorney fees to a patentee, courts look to whether the defendant's infringement was willful, whether its defense

was in bad faith, whether it committed litigation misconduct, and whether its behavior was unprofessional. *Imonex*, 408 F.3d at 1378.

190. A finding of willful infringement may be a sufficient basis to find a case exceptional and award fees to the patentee. *Golight, Inc. v. Wal-Mart Stores, Inc.*, 355 F.3d 1327, 1340 (Fed. Cir. 2004). Indeed, if a court finds willful infringement by a defendant, but does not award attorney fees, "the court must explain why the case is not 'exceptional' within the meaning of the statute." *Polymer Indus. Prods. Co. v. Bridgestone/Firestone, Inc.*, 10 Fed. Appx. 812, 819–20 (Fed. Cir. 2001) citing *Modine Mfg. Co. v. Allen Group, Inc.*, 917 F.2d 538, 543 (Fed. Cir. 1990).

B. Midtronics Is Entitled to Its Attorney Fees and Costs in this Action

191. For the reasons stated above, the Court has already determined that Defendants' infringement was willful, which supports an award of attorney fees to Midtronics in this case. In addition to the willful infringement, the Court further finds support for an award of attorney fees based on the lack of a meaningful defense and Defendants' misconduct during the litigation.

192. Defendants' only non-infringement defense was baseless. The Court construed the term dynamic battery parameter to mean the change in voltage divided by the current in current (or the inverse). As stated above, the Accused Products clearly and unambiguously perform this calculation to determine the dynamic parameter of the battery under test. Defendants' sole argument was that because the Accused Products only make one measurement of the current, they were not measuring the change in current. The Court has rejected this argument.

193. Defendants admit that there is no current flowing through the test circuitry when the current pulse is off. Thus, by definition, the current is zero at that point. Their website and literature confirm the current is zero at this time. Whatever current is then drawn by the pulse is,

by definition, the change in the current through the battery due to the testing. (PTX 28, p. BP5; PTX 34; Trial Tr. 365:20–22).

194. Defendants admit that the Accused Products contain all of the remaining limitations of claims 1–4 of the '756 Patent. Thus, Defendants' sole non-infringement position is objectively baseless.

195. In addition to raising a baseless defense, Defendants needlessly extended this case, apparently as part of their trial strategy to extend the case beyond the expiration of the patent, thereby eliminating any relief that Midtronics could obtain. During the deposition of Mr. McShane, counsel for Defendants admitted as much, stating:

> Q. Mr. McShane, are you aware that the patent in suit will expire on June 29 -- sorry, May 1, 2012?
>
> A. I wasn't aware of the specific date, no, but I know that all patents expire.
>
> Q. That is less than two years from now. We are now doing fact discovery, we will presumably then do dispositive motions, there will be replies, there will be surreplies, there will be hearings, there will be opinions, if there is, then if the case is not disposed of by then there will be a trial that will take some time and then probably there will be an appeal. None of this is going to get done before this patent is expired.
>
> It is possible that you could have a trial and the judge could give you -- grant your request for an injunction, of course it would be stayed pending appeal and he might or might not grant it, it is unusual it is not granted but it does happen, so the odds are rather slim that you are ever going to get a judgment in this case before your patent expires. So why are we still here?

(Transcript from Mr. McShane's Deposition, pp. 91:7–92:4, attached as Appendix F-2 to Docket No. 171 and as Exhibit K to these proposed findings).

196. Moreover, Defendants came to this Court on July 17, 2009 and indicated that they were willing to redesign their products to remove a key feature and stop selling the accused products:

> So my client, if we step back eight months or so, has informed Midtronics that defendants are willing to design around the patent in suit; that is, they are willing to take out the very feature that is the claimed novelty in this patent, the circuitry for receiving battery type information. We are just going to take it out, and we have told them that.
>
> * * *
>
> We are willing to compromise by taking our product off the market, design around, and we are willing to enter into a consent judgment that says that the '756 patent was infringed, but you can only use this consent judgment as to the '756 patent.

(Hearing Transcript from July 17, 2009 attached as Exhibit J, pp. 11:3–8 and 12:15–19).

197. On September 24, 2009, Defendants reported that the redesign was complete and that it was "unquestionably noninfringing." (Hearing Transcript from September 24, 2009, attached as Exhibit L, p. 2:13–19). The representation is flatly contradicted by Mr. Kallfelz who admitted that Defendants expected that the AA550P infringed the '756 Patent. (Trial Tr. 457:10–13).

198. Defendants' redesign process delayed the litigation by months and resulted in the introduction of another infringing product—the AA550P—to the litigation that required Midtronics to spend additional time and resources analyzing it. (Trial Tr. 288:12–22, 327:11–328:5).

199. Defendants' conduct during discovery also fell short of acceptable standards. During the Rule 30(b)(6) deposition of Defendants, Mr. Kallfelz was designated to provide information for Defendants about their invalidity positions. Mr. Kallfelz turned out to know nothing or said he knew nothing about this subject, however. At the hearing on April 16, 2009,

the Court remarked that Defendants' conduct was wrong and that fee shifting may be appropriate.

> And then I got the business about, which I also had to read the designated witness Argus' owner Mr. Caulfield [sic] as 30(b)(6) witness who turned out to know nothing, or said he knew nothing. you know that's not the way any litigation should be conducted candidly.
>
> * * *
>
> And by the way, I thought a good deal about whether under Rule 37 that ought to carry with it a shifting of fees on the motion and on that deposition, which turned out to be a dry run. Now I know that the rule I guess 37(a)(5)(A), I think it is, requires an opportunity to be heard, so I am not ruling on that now. But I want to commend that issue to the parties because it was just wrong to do what has been done.

(Hearing Transcript from April 16, 2009, attached as Exhibit M, pp. 4:12–16, 5:14–21).

200. In addition, Defendants move to compel Midtronics to review and produce documents that were archived in a warehouse, claiming that "Plaintiff's internal files are a potential treasure trove of prior art information that could render the '756 Patent anticipated or obvious" and that this information was "critical to Defendants' invalidity defenses." (Docket No. 131, pp. 4–5).

201. At the hearing on April 16, 2009, the Court concluded that if the Defendants wanted these documents, they could review them at their own expense.

> And as a result my sense is that the way to deal with that is that defendants if they believe that's so, they can examine those documents on a counsels' eyes only basis, but they have got to do it at their own expense, because at least from what I have seen here, and given the posture that the thing now occupies, I just don't think that it's fair to impose on Midtronics the idea of searching through all of that stuff.

(Hearing Transcript from April 16, 2009, attached as Exhibit M, p. 6:16–23).

202. Despite the "treasure trove" of "critical" information, Defendants never requested to review the documents, which suggests that the information was not that important and that Defendants were simply trying to extend the litigation and drive up Midtronics' costs.

203. Based on Defendants' willful infringement, their baseless defense, and their misconduct during litigation that was designed to delay the resolution of the lawsuit and drive up Midtronics' costs, the Court finds that this is an exceptional case in which it should award attorney fees, expenses, and expert fees to Midtronics. The Court will set a hearing date for Midtronics to prove up these amounts.

X. Conclusion

204. For the reasons stated above, the Court finds that Defendants Argus Analyzers and BPPower infringed claims 1–4 of the '756 Patent through their offers for sale, sales, and importation of the AA350, AA400, AA500, AA500P, and AA550P battery testers. The Court also finds that Defendants have failed to prove by clear and convincing evidence that claims 1–4 of the '756 Patent are invalid. The Court further finds that Defendants' infringement was willful, that Midtronics is entitled to a permanent injunction against Defendants, that this is an exceptional case under 35 U.S.C. § 285, and that Midtronics is entitled to its attorney fees, costs, and opinion witness fees.

Dated: February 14, 2011

Respectfully Submitted,

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CERTIFICATE OF SERVICE

I, H. Roderic Heard, an attorney, hereby certify that I caused a copy of the foregoing PLAINTIFF'S REVISED PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW to be filed via electronic filing on this 14th day of February, 2011, and thereby served upon:

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